Voyage of Ship "Challenger"

GIFO and without a destination. She scientific knowledge of deep-sea life. as a man-y-war, a square-rigged three- Murray tells you that he is an Amerimeral forms of lesser life which feed good to meet. is its vast blue meadows; she let down When Murray began his work in some of its denizens, both vegetable and

new science; but that was the accompishment of the Challenger, and the sci- earth to be inhabited, the deep sea, acsee thus founded is now known as cording to the conclusions of the scienof Oceanography,"was published, the new conditions. book ever produced. It is published

some that peer their way about these

lepths with lanterns, and a thousand

other forms of life equally strange. And

mit of wonder.

af all the cargoes that the ships of the gy. Besides the deep-sea work, in every of all the brought into port in all the minute development of which he is interested, he is now working on a bathymetric survey of the Scotch lochs, and proheld the strangest and most wonderful moting a Scottish Antarctic expedition, it is the cargo of the famous ship Chal- being his firm belief that a thorough sign. In the year 1872 the Challenger of the sea bottom in the region of the South Pole will yield profoundly scientific results, especially as regards

sett, commanded by officers of the can by birth—he was born in Canada but he has lived nearly all his life in Scotland. His home is just in the outthe most eminent scientists of Great skirts of Edinburgh, on the shore of the Plain. For nearly four years she salled Firth of Forth, where he can always hear he seas of both hemispheres, from the the sound of the sea. It is a fine old stone building, pillared in front and sur-rounded by wide green lawns and ample grating her strange cargo. She drag-lodge." He is a world-wide traveler althouse with nets, not only for the grinary fish of the sea, but for the grinary fish of the sea, but for the entertaining talker—a man whom it is

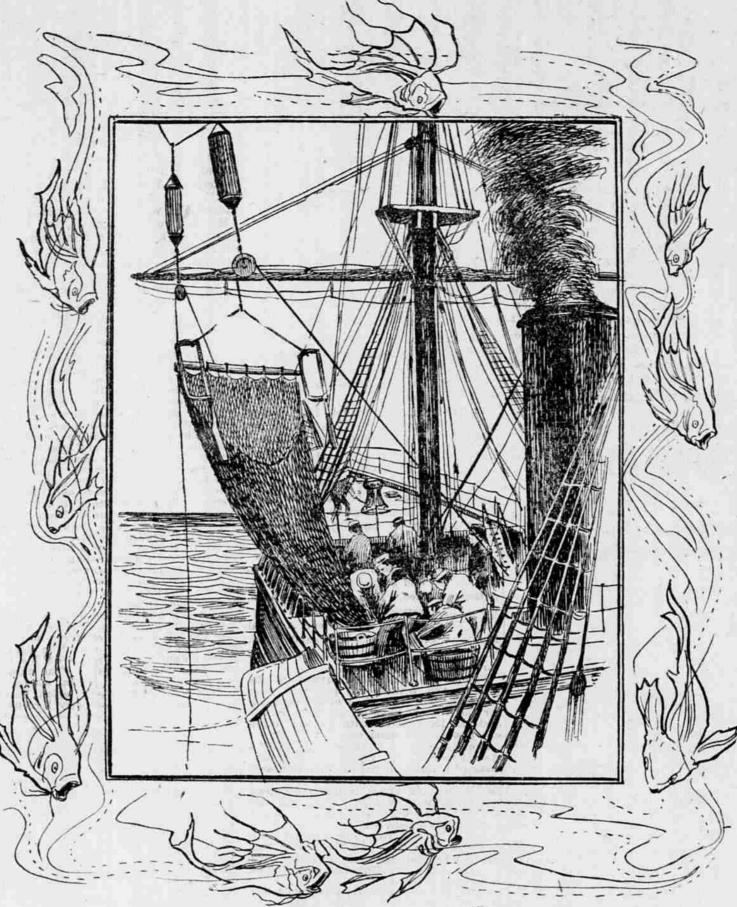
gedges and sounding plummets into the oceanography some thirty-eight years ago, scientific knowledge of the sea was meager and unsatisfactory. Something she explored all but limitless plains, over three-fifths of the globe is covered best with black darkness, and cold, with water, and there is a greater amount of life-iar greater-both vegegrigings she brought up for the eyes of the land, and yet this storehouse of wongan quantities of primeval ooze that der-the great swarming seas of the hal required the slow accumulations of world-has been almost unexplored. Huxinflion centuries, perhaps, to deposit; ley had awakened interest in the deep sea by the enthusiastic announcement of pe discovered submarine rivers, some of his famous Bathybius theory. In the nem flowing outward from the land and course of examining a number of deeprsing like a fountain from the ocean lottom; she learned of new and mighty comman currents, not the surface currents ed the primeval living slime, the unorgrown to navigators, but those which ganized beginning of life. It was a suggreep along the sea bottom, a foot in a gestion that caught the imagination; here deep in the sea bottom, in darkness solury, perhaps, carrying life-giving ox- and cold, floated, as it had floated from which the essence of life from the development of the deep sea; the beginning, the essence of life from which the whole earth had been clothed with the green of plants and populated with thousands of varying forms of animal they are hidden forever from the to be laid low in a night, here wailed to be laid low in a night, here wailed yen to the creatures of the deep sea; the beginning, the essence of life from most inconceivable strangeness of the slow, dull life-stock upon which bettom of the sea, she brought back tion

some of its denizens, both vegetable and

But when Sir John Murray and the othanimal—the appropriate creatures of cold

er scientists on the Challenger began to and darkness and the crowding presence study the problem, they found that Huxof the seas-old, pulpy, warty fishes, some ley had been misled by the fact that hand, some with eyes greatly developed, strong alcohol, such as had been used for preserving the specimens collected, will throw down a chemical gelatinous precipitate from sea water; this floccuthe thousands of specimens collected lent mass Huxley had erroneously called few had ever before been seen by the the Bathybius. A beautiful theory was thus demolished, but the structure of it is not often that a ship sails away facts reared in its place was quite as for a brief four years and brings back a wonderful. Instead of being the first place on the

ceanography. Not quite four years was tists of the Challenger, was the last. As expended in exploration and observation; life became multitudinous in shallow wabut it required nearly five times as long ter, and competition for food grew place the results in orderly and com- stronger, the weak species were slowly prehensive form before the world. It driven into the deeper, colder and darker was not until 1895 that the final volume depths of the sea, where they could live of the great report of the expedition, their lives with less interference, and which might well have been called the thir bodies became slowly modified to suit report is not only one of the very life is found everywhere in the sea, even ealest of existing works of science, but in those awful deeps five miles and more tire surface of the world's oceans, of maps and pictures. This stupen- 300 feet there are both animals and man is familiar. rtain regions of the land. And yet the Some of the fish that live here have,



BRINGING UP THE DEEP-SEA DREDGE ON THE "CHALLENGER."

mere material mass it is quite the big-below the surface of the water. The en-

fifty royal octavo volumes containing though the water may seem ever so usually badly broken, so little are they practically all the inhabited land in the that it contains that the scientist is able pages, 3,000 plates, and a large num- clear, is filled with life. To a depth of adapted to the surroundings with which world. The question as to whether man will

work, which will always remain plants; below that plant life ceases, and It is difficult to realize what this pres- ever be able to descend into the depths of the greatest monuments to Eng- there are only animals. Indeed, the sure at the ocean bottom really means; of the ocean and make direct explorascience, was under the direction, dur- whole sea surface is a vast, rich meadow how enormous it is at three miles in tions of its varied life and discover the first few years after the return which supports the life of countless depth. It is greater by several times the Challenger, of Sir Wyville Thomp- millions of animals, both in the surface than the pressure exerted by the pistons furnished rich fruit for speculation. It and, after his death, of Sir John waters and on the ocean floor miles be- of the very greatest steam engines. Sci- is not wise in these days of mechanical Eminent scientists in all parts neath. These animals, feeding in their entific men ascertain the temperature of wonder to place too positive a limit to the world had a part in making the own waving green pastures, are in turn the deep sea by sending down thermome- man's accomplishment, but it is probreports—Haeckel of Germany, Agassiz of the prey of larger animals, and in dying ters inclosed in small, strong, thick glass able that man's eyes will never look the United States, Renard of Belgium, they drop down where the slow, crawling others equally celebrated. Since the ing creatures of the great depths are collapse to a fine powder under the enorgical collapse to a fine powder under the enorgical collapse. Several years ago it me of the Challenger there have been lying in wait for them. If it were not mous pressure of several miles of depth. was my fortune to make a voyage in other deep-sea exploring expeditions, nofor this swarming life the ocean would Indeed, one may say every hollow, manlably those of Agassiz, and of Chun of appear a dense black, for these little
fermany, the report of whose voyage in creatures serve to reflect the rays of the
crushed beyond recognition before it
lands in New Jersey, and ran some dislands in New Valdivia is just now being publish sun and give the appearance of color to reaches the bottom. The strongest steel tance off Sandy Hook at the bottom of All these explorations may be said the water. In the greater depths of the ships are hardly more resisting than the Atlantic Ocean. The Argonaut was have laid bare the floor of the sea, sea, as is now well established, there is pasteboard boxes. It is astonishing how built in the shape of a huge cigar of burge, sharks, the hardest of bones. that it is better known and more no light whatever, the rays of the sun little people who cross the ocean-I mean enormously strong plates of steel, many carefully charted in many places than penetrating only a few hundred feet. passengers—think of these wonders beneath them; but John Tar of the fo'c'sep sea will ever be the home of mys- therefore, developed a curious, whiplike tle, who has lived at sea long enough forty feet for fear of the pressure of ery-an inexhaustible field for discovery, projection above their heads, on the end to feel its mighty mysteries-he thinks! the sea. When one realizes that the a place where the human imagination of which grows a real lantern, a small It is a very terror that dwells beneath ocean has deeps of nearly 30,000 feet, a may run riot, and yet never reach the bulb producing phosphorescent light, him. Sir John Murray tells how the Most of them have huge mouths, and as fo'c'stle once sent a deputation to him utter feebleness of man and the inade-For many years Sir John Murray, the they swim slowly about through the wa- to ask what had become of Jim. Jim quacy of his poor inventions. And yet rector of the Challenger work, has been ter other fish, perhaps some of those had died the day before, and, sewed in even at the depth of thirty feet ones the foremost authority in all questions which have developed enormously large sail-cloth, his body had slipped over the may gain some impression of the awful sertaining to the new science. All the eyes, are lured straight into the cavern-side in mid-ocean. Part of the fo'c'stle somberness of the sea deeps. We had hedgings made by scientists the world our mouth of the lantern-bearer, there asserted that Jim would never reach left sunshine and a blue sea dotted ver, including those taken by the cable to be digested at leisure. Other fish bottom and part asserted that he would, with the sails of oyster smacks, and onnies while making surveys of pro- there are that creep their lives out on the Murray explained the crushing pressure fined cable routes, find their way, soon- sea floor, sluggishly taking in the coze of the water; how one by one the bones ness, the water here being somewhat or or later, into his hands and are ex- and digesting the bits of vegetable or would be broken in-implosion, science muddy. There was a dim yellowness ned at his laboratory. It was my animal substances that remain to it after calls it; how the flesh would be crush- beyond the glass ports, and here and to spend some time recently it has fallen through miles of sea water, ed into the interstices of the bones, and there the shadowy form of a curious Sir John Murray at his home in Sir John Murray thinks it probable that the clothing flattened over them until, fish. But what sank heaviest on the cotland and to hear from him some ac-fully three-quarters of the deposits now on reaching the bottom, the body would count of the recent developments in the covering the ocean bottom have passed probably not be larger than a man's knowledge of the deep sea. During my through the alimentary canals of the wrist. It is a grewsome thought, and slay in Edinburgh Sir John Murray was millions upon millions of marine animals, yet nothing could give a more impres-

sink her hardly deeper than thirty or we had descended to almost total darkspirits was the eternal silence, the motionlessness, the coolness; and if impression came so strongly at thirty feet, what must be the awful loneliness We were submerged for some three or four hours, and never did sunshine and green hills look more welcome than they did when the Argonant thrust her back above the waves wreck, therefore, though battered and crushed almost beyond recognition, will always reach bottom, there to be slowly eaten away until the last of it disappears. For the sea is a vast laboratory in which all things are dissolved. It is a significantly curious fact that of all the thousands of dredgings made in the deep-sea bottom, nothing man-made ever has been brought up, except some worm-riddled portions of a ship's plank forty-three places in various parts of the dredged by Sir John Murray from a depth of three-quarters of a mile, to the north of Scotland during the Triton miles in depth. These he calls "deeps," expedition, although many dredgings and to each he has given the name have been taken in main routes of ves- some famous oceanographer or navigasels across the Atlantic. The ocean receives what fortune brings, and not steamship passes over or nearly over only swallows it silently, but utterly some of these awful deeps. Libbey and wipes it out of existence, in its original form, until its substance is a part of for Captain Sigsbee of Maine fame, are its own transparent blue. It may be south of Nova Scotia and east of New that bits of glass and gold from sunken York; Suhm Deep is a little farther to ships remain long after the steel of the the east. These are all small in area hulk has dissolved, but sooner or later Nares Deep, northeast of the West Ineven these disappear. ed to think of wrecks in the sea bottom ocean valleys are the Tuscarora Deep as slowly being covered by deposits from off the coast of Japan, the Aldrich Deep the water; the suggestion of a sunken east of New Zealand, the Ross Deep of ship instantly brings a vision of a half- the Antarctic. These great deeps cover buried hulk with skeleton ribs and the more than 7,000,000 square miles of the stump of a mast reaching out above, and sea-weed and peering fishes. In shallow water near the shore or in har-

ed, but as Sir John Murray shows,

to tell so accurately the spot in the ocean from which it is dredged.

Descending the plains of the sea into still deeper depths, where the bottom is from two miles to five miles below the surface, even these shells disappear, the treasures of derelict gold, has always delicate and fragile ones first, and there is a vast stretch of soft red clay, covering, as Murray estimates, fully half of the entire ocean floor. Here the shells have fallen so far through the water of creatures, mostly tile-fish, were killthat they have been wholly dissolved, and the deposit is made up, as the ered the ocean bottom for many square dredgings show, of pumice thrown up by miles, a condition bringing forcibly volcanoes, along with the products of its mind Coleridge's lines: en into the sea. Here, also, are found considerable deposits of the ear bones many of them covered with deposits of manganese. A single dredging from the Challenger in the central Pacific brought up many bushels of manganese nodules. 1,500 sharks' teeth, and 500 fragments of whales' bones. What a graveyard is this! How many thousands of centuries it must have taken to deposit so many remains of animals in one small spot! The fact that many of the bones were from extinct species that lived long ago, and that they are found mingled with the bones of living species, shows now slowly the bottom of the sea is being The Challenger dredge filled in. brought up in one haphazard sweep materials that the slow ocean had been hoarding there, perhaps, for a million years or more. Sir John Murray hopes that some time a dredge will be devised for boring into the bottom of the deepest sea, so that scientists may learn just how deep the deposits really are, and what was their nature when the oceans were new.

In this connection, one of the most interesting facts established by the Challenger expedition was the large proporion of the ocean in which the depths are profound. We are accustomed to thinking of 100 fathoms (600 feet) as deep water, but only a small proportion of the sea is of this depth or less-a thin fringe around the dand, about 7 per cent of the total sea area. Of the remainder of the ocean area, 62 per cent is deeper than 2,000 fathoms (nearly two and one-half miles). In making his charts of the sea floor Murray has marked no fewer than world in which the ocean is over 3,000 fathoms, or nearly three geographical tor. Every passenger on an Atlantic We are accustom- dies, is much larger in extent. Other ocean floor, and of all of them the deepest, so far as science was informed

year ago, is the Aldrich Deep, and the the deepest spot there found is to the east of the Kermadees and Friendly Isiands. Here the thin steel piano wire used in soundings reached bottom at a depth of more than five geographical miles. One has to pause and think before he can realize what such a depth really means, Compare with it the greatest heights of the dry earth. Sink Mount Everest of me Himalayas here in the sea, and its extreme summit would do no more than reach to the surface of the water. Even though the sea were bare of water, it would be a bold man indeed who would dare to venture into this awful valley, and though he dared, he might not live to tell the story of his intrepidity. It is a curious fact that the distance from the top of the highest mountain to the bottom of the deepest sea is over ten miles, so that in reality, measuring from the earth's deepest valley, our highest mountains have an altitude of ten miles. The surface of the earth is thus broken and scarred, and yet, compared with the size of the planet, its deepest depths are mere plow-furrows scratching its sur-There are many volcanoes on the sea bottom-volcanoes that burst open the sea floor, beich forth quantities of molten earth, and are then choked out by the water. Sometimes mariners see the results of these eruptions on the surface, and sometimes so deep are the disturbances that nothing ever reaches the top or ruffles the peace of the sea's surface. Then there are probably other great commotions-vast avalanches slipping from the steep mountains and plunging thousands of feet, perhaps, into deeper depths-avalanches that rush and fall without a sound.

Deep dredgings show that most of the sea bottom is a region of cold, the temperature of the water, even at the equator, being sometimes below the freezing point of fresh water. For a time science could not offer any satisfactory explanation for this strange condition, but it is now proved that the water of all the oceans circulates steadily, not only is the familiar superficial currents of which the Gulf Stream is the most representative type, but in a slow and mighty movement from the Arctic and Antarctic poles, creeping southward and northward along the sea bottom to the hot regions of the equator, there rising to the surface very slowly, and settling northward and southward toward the poles, thus keeping up a constant circulation. The cold water of the frigid zones absorbs air and carries it downward to supply the creatures of the deep sea with oxygen. If it were not for this provision of nature, it is probable that life could not exist beyond a few hundred feet below the surface of the water. The Black Sea, which has no deep connection with the ocean, and has, therefore, no such circulation, is without deep-sea life, except bacterial, its depths being filled with foul, sulphurcharged water. It is estimated that over 2 per cent of the ocean floor has a emperature lower than 40 degrees Fahrenheit, the freezing point of fresh water being 32 degrees. Frequently, while in hot equatorial regions, the Challenger dredges brought up great masses of coze for cooling the ship's drinking water. The warmest of all bodies of salt water is the shallow Red Sea which has a temperature, even in its greatest depths, of 70 degrees. It sometimes happens that great storms or violent off-shore winds displace the surface water to such an extent that large amounts of cold water are brought up from the depths. In such cases the creatures of the deep sea meet their doom, millions of them being killed. In 1882, off the eastern coast of North America, there was a sudden change of this character, and uncounted billions ed, and it was estimated that a layer of their bodies six feet in thickness cov-

"The very deep did rot: O Christ! That ever this should be! Yea, slimy things did crawl with legs

Upon the slimy sea." The whole science of oceanography replete with fascination and wonder, and each year it appeals more strongly to investigators as well as to the popular mind. Professor Agassiz has just returned from a long voyage in the Pacific on the United States ship Albatross. A German expedition is now fitting out for Antarctic exploration, an English expedition will soon sail, and, as I have already mentioned, Sir John Murray promoting a Scotch expedition. thus oceanography, though new, is becoming one of the great departments of nitural science. (*Water can be compressed only one

wenty-thousandth of its bulk.)

REMARKABLE CURES OF RHEU-MATISM.

From the Vindicator, Rutherfordton,

The editor of the Vindicator has had occasion to test the efficacy of Chamberlain's Pain Balm twice, with the most remarkable results in each case. First, with rheumatism in the shoulder, from which he suffered excruciating pain for ten days, which was relieved with two applications of Pain Balm, rubbing the parts afflicted and realizing instant benefit and entire relief in a very short time. Second, in rheumatism in thigh joint, almost prostrating him with severe pain, which was relieved by two applications, rubbing with the liniment on retiring at night, and getting up free from pain. For sale by Benson, Smith

THE DIFFERENCE

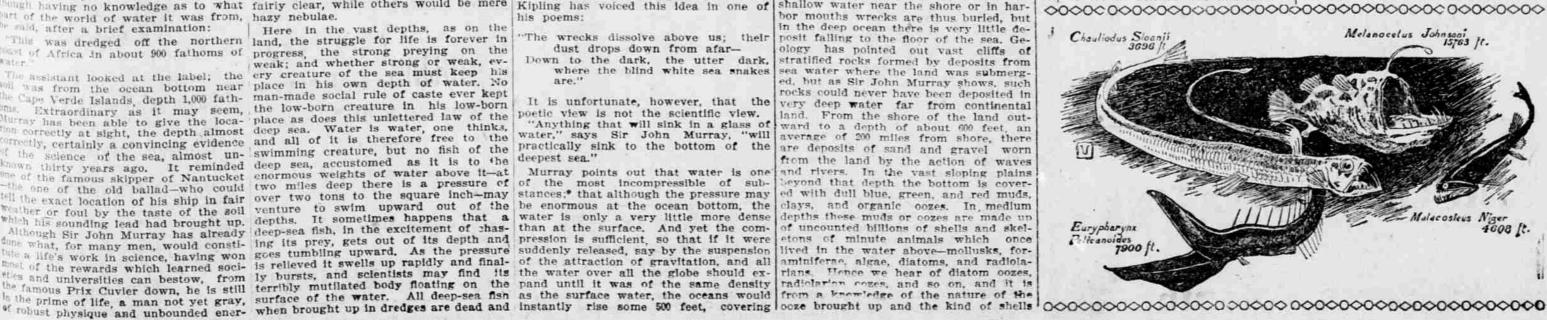
& Co., Ltd., sole agents Hawaii Terri-

Lady-I see you advertise home-made

Baker-Yes, ma'am. Lady-Does it taste like home-made? Baker-No, indeed, ma'am. It's sweet

and light.-New York Weekly.

Pennsylvania University has a new mascot. Down in the big swimming pool, in the basement of Houston Hall, floats Ben Franklin. He is a big duck, originally white, though now dyed in the university colors.





series of dredgings made; Many animals of the deep sea are able sive idea of the awful power of the

the world of water it was from, hazy nebulae. after a brief examination:

assistant looked at the label; the Verde Islands, depth 1,000 fathhas been able to give the locarrectly at sight, the depth almost

recent German expedition. A little to produce phosphorescent light, so that deep sea. at in the course of the investigation although no sunshine ever penetrates so It is the belief common among sailors how how thoroughly the sea bot- deep, and many fishes, through centuries that a wreck never goes to the bottom: known to a scientist who, like of almost total darkness, have lost their that it sinks until the pressure of the has devoted his whole life to its power of sight, there is yet some light water holds it fast, and there, rocking The dredgings came in small bot- even here. If one were able to take his abou in the shadowy depths, it slowly by were mostly grayish or red- place on a sea cliff two miles below the dissolves. What food for the imaginacolor, fine of texture, and, to the ocean level he would probably see thou- tion lies in this fleet of the lost navies y eye, as much alike as so many sands of queer, glowing, moving lights, of the world, still floating up and down n assistant had placed a sample like holes in black darkness, such as in the deep, meeting and passing in stee of the bottles under the micro- men can not well imagine. Some of lence, no voice ever calling through the Murray looked at it, and, al- them would appear like bright points, dark, no sail ever rising to the breeze. having no knowledge as to what fairly clear, while others would be mere Kipling has voiced this idea in one of

Here in the vast depths, as on the was dredged off the northern land, the struggle for life is forever in Africa in about 900 fathoms of progress, the strong preying on the weak; and whether strong or weak, every creature of the sea must keep his as from the ocean bottom near place in his own depth of water. No man-made social rule of caste ever kept Extraordinary as it may seem, the low-born creature in his low-born place as does this unlettered law of the deep sea. Water is water, one thinks, ly, certainly a convincing evidence and all of it is therefore free to the clence of the sea, almost un- swimming creature, but no fish of the thirty years ago. It reminded deep sea, accustomed as it is to the the famous skipper of Nantucket enormous weights of water above it-at one of the old ballad—who could two miles deep there is a pressure of the most incompressible of subther or foul by the taste of the soil venture to swim upward out of the his sounding lead had brought up. depths. It sometimes happens that a water is only a very little more dense than at the surface. And yet the combination of shells and skelling the pressure may be enormous at the ocean bottom, the water is only a very little more dense than at the surface. And yet the combination of shells and skelling the pressure may be enormous at the ocean bottom, the water is only a very little more dense than at the surface. And yet the combination of shells and skelling the pressure may be enormous at the ocean bottom, the water is only a very little more dense than at the surface. And yet the combination of shells and skelling the pressure may be enormous at the ocean bottom, the water is only a very little more dense than at the surface. And yet the combination of shells and skelling the pressure may be enormous at the ocean bottom, the water is only a very little more dense than at the surface. And yet the combination of uncounted billions of shells and skelling the pressure may be enormous at the ocean bottom, the water is only a very little more dense than at the surface. And yet the combination of uncounted billions of shells and skelling the pressure may be enormous at the ocean bottom, the clays, and organic occess. In medium water is only a very little more dense than at the surface. what, for many men, would consti-ing its prey, gets out of its depth and pression is sufficient, so that if it were a life's work in science, having won goes tumbling upward. As the pressure suddenly released, say by the suspension of the rewards which learned soci- is relieved it swells up rapidly and final- of the attraction of gravitation, and all aminiferae, algae, diatoms, and radiolaand universities can bestow, from ly bursts, and scientists may find its the water over all the globe should ex-

his poems:

dust drops down from afar-Down to the dark, the utter dark, where the blind white sea snakes

poetic view is not the scientific view. 'Anything that will sink in a glass of water," says Sir John Murray, "will practically sink to the bottom of the deepest sea."

Murray points out that water is one famous Prix Cuvier down, he is still terribly mutilated body floating on the pand until it was of the same density radiclar'en cozes, and so on, and it is the prime of life, a man not yet gray, surface of the water. All deep-sea fish as the surface water, the oceans would from a knowledge of the nature of the

The wrecks dissolve above us: their It is unfortunate, however, that the very deep water far from continental